APPLICATION
FOR
UNITED STATES LETTERS PATENT

TITLE: **METHOD FOR DESCRIBING FINANCIAL INTRUMENTS**

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"EXPRESS MAIL" Mailing Label Number EL478578398US

Date of Deposit March 4, 2002

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METHOD FOR DESCRIBING FINANCIAL INSTRUMENTS

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of the filing date of U.S. provisional application serial number 60/343,696 entitled "Method for Describing Financial Instruments" which was filed on December 27, 2001.

BACKGROUND

The following invention relates to a method for describing financial instruments and, in particular, to a method for improving the efficiency of communicating information pertaining to debt instruments.

Debt instruments are complex investment products the performance of which typically depends on a several basic characteristics. For example, a bond's price-yield relationship depends on its maturity, redemption features, coupon features (for e.g., step ups) and the convention in the underlying market (for e.g., the yield calculation method). In addition to these basic features, a particular bond may include other features that affect the bonds yield including, by way of example, the type of coupon provided, the settlement date, the ex-dividend date, the type of accrual, the amortization rate, the capitalization date and the recovery right. In all there are approximately 40 features that effect bond yield. For any given bond, however, only a subset of these features may be relevant to describe the yield of the particular bond.

Because the yield of a bond depends on numerous characteristics that can vary depending on the bond type, it is important that those transacting in a particular bond clearly and accurately document the features of the bond to avoid any misunderstandings between the transacting parties. Presently, however, there is no uniform method for accurately describing the numerous features of a bond. The need for an accurate and uniform method for describing bond

information is particularly great in situations where the bond information is to be electronically communicated between two systems (for example, a client device requesting a price quote from a pricing engine). In this context, not having a method for accurately and uniformly describing bond characteristics may result in different systems being unable to accurately and effectively communicate bond information.

Accordingly, it is desirable to provide a method for describing debt instruments and for improving the efficiency of communicating information pertaining to debt instruments.

SUMMARY OF THE INVENTION

The present invention is directed to overcoming the drawbacks of the prior art. Under the present invention a method is provided for communicating a description of a bond between a first entity and a second entity and includes the step of selecting at least some attributes that are associated with the bond from a plurality of bond attributes. Next, a value for each of the at least some attributes is chosen. Next, the description of the bond is created by formatting the values for the at least some attributes according to a document type definition. Finally, the description of the bond is communicated between the first entity and the second entity.

In an exemplary embodiment, the bond attributes include maturity and redemption.

In another exemplary embodiment, the bond attributes includes at least one attribute selected from the group including a coupon type, a settlement date, an ex-dividend date, an accrual type, an amortization rate, a capitalization date, a tax status and a recovery right.

In yet another exemplary embodiment, the bond has a yield and at least some of the at least some attributes relate to the yield of the bond.

In still yet another exemplary embodiment, the at least some of the at least some of the attributes identify the bond.

In an exemplary embodiment, the document type definition conforms to an Extensible Markup Language syntax.

In another exemplary embodiment, the bond is a corporate bond.

In yet another exemplary embodiment, the bond is a government bond.

In still yet another exemplary embodiment, the bond is an emerging market bond.

Under the present invention, a method for forming a description of a bond is provided and includes the step of selecting at least some attributes that are associated with the bond from a plurality of bond attributes. Next, a value for each of the at least some attributes is chosen. Finally, the description of the bond is created by formatting the values for the at least some attributes according to a document type definition.

In an exemplary embodiment, a first entity and a second entity is included and the method includes the step of communicating the description of the bond between the first entity and the second entity.

Under the present invention, a system for communicating a description of a bond is provided and includes a first entity that selects at least some attributes that are associated with the bond from a plurality of bond attributes. The first entity also chooses a value for each of the at least some attributes and the first entity then creates the description of the bond by formatting the values for the at least some attributes according to a document type definition. Also included is a second entity that is in communications with the first entity. When the first entity communicates the description of the bond to the second entity, the second entity interprets the description according to the document type definition.

In an exemplary embodiment, the first entity includes an XML processor for formatting the values for the at least some attributes according to a document type definition.

In another exemplary embodiment, the second entity includes an XML processor for interpreting the description according to the document type definition.

Accordingly, a method is provided for describing debt instruments and for improving the efficiency of communicating information pertaining to debt instruments.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts that will be exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims. Other features and advantages of the invention will be apparent from the description, the drawings and the claims.

DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an Extensible Markup Language document type definition for describing a bond in accordance with the present invention;

FIG. 2 is an Extensible Markup Language document for describing a particular corporate bond using the document type definition of FIG. 1; and

FIG. 3 is a block diagram of a system in which bond information is communicated according to the method of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, there is shown an Extensible Markup Language (XML) document type definition (DTD) 101 for describing a bond in accordance with an exemplary embodiment of the present invention. XML is an open technology standard designed to facilitate structured data interchange on the World Wide Web. The XML standard includes the use of document type definitions that provide a formal description format for specific documents using XML syntax. More specifically, a DTD typically sets out the names that are to be used for the different types of element, where they may occur within the document and the ways the different elements may combine for a particular document type. XML and the use of document type definitions are discussed in detail at http://www.w3.org/TR/xmlschema-0/, the contents of which are incorporated herein by reference.

As described above, a bond's yield may depend on any number of attributes (see Appendix for a listing and description of these attributes). For example, DTD 101 of FIG. 1 may be used for describing bonds by using various bond attributes including attributes that pertain to bond identification, calendar, issue date, settlement date, ex-dividend date, accrual information, price, yield, payment periods, coupons, capitalization, amortization, stepup date, value recovery right, option schedule and rolling guarantee information associated with a particular bond. The bond features that may be used to describe a particular bond using DTD 101 are listed in section 103 of DTD 101. The bond features set forth in section 103 may be used to describe a variety of different bond types including, by way of non-limiting example, government, emerging market and corporate bonds.

DTD 101 includes a section to be used for describing any of the various bond features listed in section 103 including an issue date section 107, a settlement date section 109, an ex-

dividend section 111, an accrual section 113, a price section 115, a yield section 117, a periods section 119, a coupons section 121, a capitalization section 123, an amortization section 125, a stepup section 127, a recovery right section 129, an option schedule section 131 and a rolling guarantee section 133.

In addition to the bond attributes listed in section 103, DTD 101 also may include other bond attributes that are necessary for fully defining the bond attributes. For example, the coupon feature of a bond may require that additional attributes be specified for fully defining the bond's coupon feature. These additional attributes may include, by way of non-limiting example, whether the coupons are periodic coupons, detailed coupons or perpetual coupons.

In addition to the bond features included in section 103, in an exemplary embodiment a DTD may be formed including any other attributes that are required to fully describe any other type of bond. Also, any features not impacting any of the analytic calculations may not included in a DTD used to describe the particular bond.

DTD 101 also includes certain elements that are used to describe a particular bond but that do not relate to the yield performance of the bond. For example, section 105 of DTD 101 is a bond identification element in which bond attributes such as, by way of non-limiting example, CUSIP number, ISIN number and country class are included to identify the particular bond.

Because DTD 101 is a comprehensive template for describing the features and attributes of a particular bond in a uniform way, various elements included in DTD 101 may not be relevant for describing a given bond. Thus, only a portion of the elements included in DTD 101 may be required to fully describe the attributes of a given bond.

Referring now to FIG. 2, there is shown an XML document 201 for describing a particular corporate bond according to the document definition of DTD 101. The process of

describing the bond using DTD 101 includes substituting the relevant values for the features that affect the yield of the particular bond and formatting the results into an XML document that conforms to DTD 101. For example, document 201 includes an identification section 203 that indicates that the country class for the particular bond is Brazil, the CUSIP number is tt3163066 and the ISIN number is XS0049993479. Document 201 also includes a calendar section 205 that defines a holiday center(s); a settlement section 207 that indicates settlement information; an accrual section 209 that defines an accrual periodic; a yield section 211 that defines a yield method and the day count type on which the yield calculation is based; a coupon section 213 that defines the coupon type (e.g., periodic), the first coupon date, the coupon maturity date and the coupon frequency; a capitalization section 215 in which a list of capitalization dates and amount are defined; an amortization section 217 in which a periodic amortization date and an amortization amount is defined; and an option schedule section 219 in which a periodic option schedule is defined as well as the option type, option start date, option strike price, frequency and option termination date.

Accordingly, XML document 201 may be used to accurately and uniformly define a bond by the attributes that affect the bond's yield. By conforming to the document definition contained in DTD 101, an entity may describe the particular bond and accurately communicate the bond description to other entities that adhere to the document definition of DTD 101.

Referring now to FIG. 3, there is shown a block diagram of a system 301 in which bond information is communicated according to the method of the present invention. System 301 includes a client access device 303 (for example a personal computer executing a graphical user interface) that receives bond price quote from a pricing engine 305 that is operated by a financial institution and that receives real-time information and calculates a bond price. In the event the

client desires to execute a transaction based on the price quote received, pricing engine 305 forwards a bond trade request to a trading engine 307. Trading engine 307 may communicate with a counterparty 309 in order to complete the trade request requested by the client. Once the trade is completed, trading engine 311 communicates the transaction details to a settlement system 311 that in turn causes the transaction information to be posted in the financial institution's books and records 313.

Each device in system 301 includes an XML processor 315 for ensuring that communications between the devices are according to the document definition of DTD 101. For example, upon determining a price quote in response to a price request from a client, pricing engine 305 passes the bond price quote details to XML processor 315(5) that then formats the bond information associated with the price quote into an XML document that conforms to the document definition of DTD 101. XML processor 315(3) associated with client access device 303 then receives the XML document and presents the bond information to client access device 303 in any format suitable for presentation to the client. Similarly, communications between pricing engine 305 and trading engine 315 is managed by XML processors 315(5) and 315(7), respectively, so that communications conform to the document definition of DTD 101. XML processors 315(11), 315(9) and 315(13) provide a similar function in managing the communication of bond information on behalf of settlement system 311, counterparty 309 and books and records 313, respectively. Thus, because each device in system 301 communicates with any other device according to the uniform document definition of DTD 101, the communicating of bond information between devices is accurate and efficient.

In an exemplary embodiment, each device in system 301 communicates natively in XML according to the document definition of DTD 101. For example, upon determining a price quote

in response to a price request, pricing engine 305 formats the bond information associated with the price quote into an XML document according to the document definition of DTD 101. While system 301 includes certain devices and entities that describe bond attributes and communicate such bond information using an XML syntax according to the document definition of DTD 101 of the present invention, any other device or entity that desires to describe a bond and communicate such bond information may do so using XML syntax according to the document definition of DTD 101.

Although the description above included the use of XML syntax for creating documents to describe the attributes of a bond, it will be obvious based on the above to use any other document formats in a similar way to uniformly and accurately define the characteristics and features of a bond. Also, it will be obvious based on the description above to apply the method of the present invention to financial instruments other than bonds and to other information as well.

Accordingly, the present invention provides a method for describing debt instruments in an accurate and uniform manner. Under the present invention, a document type definition is provided that includes bond attributes and features that affect the yield of bonds and that are therefore necessary for describing the bond. Based on the document type definition, an XML document is formed for a particular bond by inserting the values for the attributes that affect the yield of the bond in the XML document. By describing bond information uniformly using the document type definition of the present invention, bond information can be accurately and efficiently communicated between different entities.

A number of embodiments of the present invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and

scope of the invention. Based on the above description, it will be obvious to one of ordinary skill to implement the system and methods of the present invention in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. Each computer program may be implemented in a high-level procedural or object-oriented programming language, or in assembly or machine language if desired; and in any case, the language may be a compiled or interpreted language. Suitable processors include, by way of example, both general and special purpose microprocessors. Furthermore, alternate embodiments of the invention that implement the system in hardware, firmware or a combination of both hardware and software, as well as distributing modules and/or data in a different fashion will be apparent to those skilled in the art and are also within the scope of the invention. In addition, it will be obvious to one of ordinary skill to use a conventional database management system such as, by way of non-limiting example, Sybase, Oracle and DB2, as a platform for implementing the present invention. Also, network access devices can comprise a personal computer executing an operating system such as Microsoft Windows™, Unix™, or Apple Mac OS™, as well as software applications, such as a JAVA program or a web browser. Network access devices 203-205 can also be a terminal device, a palm-type computer, mobile WEB access device or other device that can adhere to a point-to-point or network communication protocol such as the Internet protocol. Computers and network access devices can include a processor, RAM and/or ROM memory, a display capability, an input device and hard disk or other relatively permanent storage. Accordingly, other embodiments are within the scope of the following claims.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in carrying out the above process, in a described product, and in the construction set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

APPENDIX

Mandatory "ids" element
Identifies the bond. It must be composed of one or more "id" elements:

- **Mandatory "id" element**

  All non-FFLIB bond analytic functions will refer to a bond via one of its "id" elements: an idClass and idValue. Hence it is composed of the following elements:

  - **Mandatory "id_class" element**

    Defines the class of the specified id. Typical class would be "cusip", "isin", "country-class", "sometest"...

    Allowed inputs: any string is allowed

    Example: <id_class>ISIN</id_class>

  - **Mandatory "id_value" element**

    Defines the value of the specified id. For instance, if the id class is "cusip", a typical id value could be "zz202082" ... if the bond is the Gilt 9.75 2002! Each pair of class and value must be unique to the bond. For instance, across a given id class such as "cusip", the cusip value of the bond represented by the "id_value" element must be unique among all bonds in the static data.

    Allowed inputs: any string is allowed

    Example: <id_value>AU0000XCLWH5</id_value>

Mandatory "calendar" element
Defines the holiday centre(s). Refer to basic_types.dtd description for more details.

Optional "issue" element
Defines the issue information. It contains the following elements:

- **Mandatory "date" element**

  Defines the date the bond was issued. Currently this date doesn't intervene in the analytics

  Allowed inputs: any valid date.

- **Optional "issuer_name" element**

  string describing the bond issuer. This information doesn't intervene in the analytics

  Allowed inputs: any strings is allowed.

  Example: <issuer_name>Accor - Hotels&Motels</issuer_name>

- **Optional "issue_price" element**

  Defines the price the bond was issued at. It defaults to 100 (as 100% of the face value). It is mainly used for partly-paid bonds and affects the interest payments.

Allowed inputs: a price based on 100 face value.

- **Optional "defaulted" element**

Specified when the issuer has defaulted on the bond and gives the date it defaulted. This date, combined with any rolling guarantee the bond may have, will affect the bond cashflows.

Mandatory "settlement" element
Defines the settlement information. It contains the following elements:

- **Mandatory "date_context" element**

Defines the number of days needed for settlement to occur given a trade date.

Allowed inputs: any valid date_context string

Example:

<date_context>3bd</date_context>

- **Optional "lockout_period" element**

Defines the lockout period as a number of days. The lockout period is the number of business days prior to a coupon date within which the assumed settlement date must be postponed to the next business day on or after the coupon date.

Allowed inputs: any positive number

Example:

<lockout_period>3</lockout_period>

Optional "ex_dividend" element
Optional element that defines how a bond may go ex-dividend. A bond goes ex-dividend when the settlement date lies within a given number of days from the next coupon, in which case the interest is not paid to the buyer. It is composed of:

- **Mandatory "periodic_ex_dividend" element**

Defines the ex-dividend rule to be the same for all interest payments. it is composed of a "date_context" element that defines the interval between each nominal coupon date and its ex-dividend date.

Optional "accrual" element
Optional element that defines accrued interest calculations. One of the following elements must be specified:

- **mandatory "periodic_accrual" element**

Defines the accrued interest calculation to be the same for all coupon periods. It contains the following elements:

  - **Mandatory "day_count_type" element**

Specifies the day count type ("Act/Act", "Act/365f"...) on which the accrued interest is based. Because the accrued interest is based on the interest payment itself, the calculation of irregular interest payments - such as with a irregular

coupon period length - also rely on it. When no "accrual" element is specified, it will default to the yield day count type.

- **Optional "rounding" element**

Allows for rounding of accrued interest. It is based on 100 face value. For instance, if clean price is 100 as 100% of face value and accrued interest is 1.234567, rounding of "3nearest" will result in an accrued interest of 1.235.

- **Optional "accrual_from" element**

Specifies the date at which the bond starts accruing. It will affect both the first interest payment and the accrued interest prior to it. When not specified, it will default to the regular interest accrual date at one coupon period from the first coupon date. The resulting interest accrual date is adjusted according to any date adjustment (default date adjustment is End-Of-Month).

Optional "price" element
Optional element that allows specific formatting of the bond clean price. It is composed of the following:

- **Optional "price_rounding" element**

Allows rounding of the clean price within a specific time range.

- **Optional "flat_trading" element**

Specifies a time range where the bond trades flat (null accrued interest).

Mandatory "yield" element
Mandatory element that specifies the bond yield calculation. This yield is normally the default yield for the bond in Bloomberg. It is composed of the following:

- **Mandatory "day_count_type" element**

Specifies the day count type ("Act/Act", "Act/365f"...) on which the yield calculation is based.

- **Mandatory "yield_method" element**

Specifies the method by which the yield is determined from the price. This yield method may be overridden at the last coupon period(s) by the linear last period yield method.

- **Mandatory "frequency" element**

Specifies the yield compounding.

Optional "linear_last_periods" element
Specifies the last coupon period(s) of the bond within which its yield method is Money Market. The yield frequency defaults to the coupon frequency. It is composed of the following:

- **Mandatory "day_count_type" element**

Defines the day count used for the linear last period yield.

- **Mandatory "nb_periods" element**

Specifies the number of coupon periods the bond uses the linear last period yield before maturing.

- **Optional "start_on_ex_dividend_date" element**

For most bonds, the ex-dividend period immediately prior to the coupon period(s) using the linear last period yield will use the standard yield convention. When this is not the case, "start_on_ex_dividend_date" element can be specified, hence the linear last period starts on the ex-dividend date of the coupon.

Mandatory "defined_by_annualised_rates" element
Interest and principal payments of the bond must be defined by annualized rates. If only the cashflows of a bond are known, one must first find the corresponding annualized rate of each cashflow. It is composed of the following elements:

- **Optional "capitalisation" element**

Specifies any capitalisation the bond may have. Each capitalisation rate specifies an accretion of the outstanding principal. When a capitalisation occurs, part of the coupon goes into capitalisation, and the effective interest payment at the capitalisation date is therefore smaller. It must be composed of one or more of the following pair of "date"-"amount" elements:

  - **mandatory "date" element**

  Date the capitalisation occurred.

  - **Mandatory "amount" element**

  Amount, in percentage based on 100, by which the outstanding principal is accreted.

- **Mandatory "principal_repayment" element**

Defines how the principal is to be paid. It must be defined by either of the following elements:

  - **"maturity" element**

  Defines a bullet principal payment. It is composed of the following elements:

    - **Mandatory "date" element**

    Maturity date at which the principal is fully repaid.

    - **Optional "amount" element**

    Redemption amount. It defaults to 100 as 100% of the face value.

  - **"perpetual" element**

  Defines a perpetual bond that never pays back its principal. Perpetual bonds can have periodic or detailed coupons defined. The cashflows shown by Phi will include only the defined ones, but the price-yield relationship will take all cashflows into account and approximate the residual cashflows that are not shown.

- **"periodic_amortisation" element**

Defines a bond that redeems its principal in series of payments of regular dates and constant amount. It includes:

- **Mandatory "amortisation" element**

Specifies the first amortisation and includes:

- **Mandatory "date" element**

Specifies the date of the first amortisation.

- **Mandatory "amount" element**

Specifies the amount of each principal repayment. It is a 100-based percentage of the maximum principal outstanding - i.e. before the amortisation starts .. in other words before any amount is sunk out of the sinking fund.

- **Mandatory "maturity" element**

Specifies the maturity date (the optional "amount" element is ignored in that case). Each amortisation occurs at the coupon frequency until maturity.

- **"detailed_amortisation" element**

Defines a bond that redeems its principal in series of payments. It includes one or more of the following "amortisation" element:

- **Mandatory "amortisation" element**

Specifies the an amortisation and includes:

- **Mandatory "date" element**

Specifies the date of the amortisation.

- **Mandatory "amount" element**

Specifies the amount of the amortisation. It is a 100-based percentage of the maximum principal outstanding - i.e. before the amortisation starts, in other words before any amount is sunk.

- **"perpetual_amortisation" element**

Specifies an evergreen bond. Such bonds repay their principal as a percentage of the principal outstanding (as opposed to the maximum principal outstanding). Hence the principal repayments may never end. They also may start amortising after settlement. It is composed of the following elements:

- **Mandatory "date" element**

Defines the start date of the amortisation

- **Mandatory "repayment_rate" element**

Specifies the amount of each principal repayment. It is a 100-based percentage of the current principal outstanding.

- **Mandatory end of amortisation**

One of the following elements must be set in order to specify the end of the amortisation:

  - **"repayment_min_threshold" element**

    Defines the minimum principal outstanding, in 100-based percentage of the face value, under which amortisation ends

  - **"repayment_max_cashflows" element**

    Defines the maximum number of principal repayments

  - **"repayment_termination_date" element**

    Defines the date at which the amortisation ends

- **Mandatory "frequency" element**

Defines the frequency at which the amortisation occur

- **Optional "amortisation_begins_on_settlement" element.**

When it is set, the first amortisation date starts on or after the settlement date

- **Optional "consolidated_last_cashflow" element**

Makes the last amortisation amount equal to the full principal outstanding left to be paid. Thus the sum of all amortisation amounts is equal to the maximum principal outstanding.

□ **Optional "coupon_rates" element**

Defines the interest payments. Note that all coupon rates are nominal: they don't include capitalisation, amortisation and step-up. It is composed of the following elements:

♦ **Mandatory set of periodic or detailed coupons**

Either of the following elements must be set:

- **"periodic_coupons" element**

Defines a series of interest payments that occur at regular intervals and constant nominal rate. Please note that regular coupon dates are ones that follow the coupon frequency AND the date adjustment, so they don't have to follow regular calendar intervals. The following elements are included:

- **Mandatory "first_coupon" element**

Defines the date of the first coupon. This date must correspond to the maturity date with regards to the coupon frequency.

- **Optional "last_regular_coupon" element**

Defines the date of the last regular coupon. When the last coupon period is irregular – i.e. doesn't correspond to the coupon date with regards to the first coupon frequency – the last regular coupon date must be provided. This date must in sync with the first coupon date with regards to the coupon frequency. It also must be before the maturity date.

- **Mandatory coupon value:**

Either of the 2 following elements must be defined:

  - **"amount" element**

    Specifies the amount of the interest payment. It is a 100-based percentage of the face value, but doesn't include amortisation, capitalisation and step-up – i.e. it's nominal interest.

  - **"margin" element**

    For floating rate notes only. Specifies the margin added to the coupon amount. It is a number of basis points of the face value, but doesn't include amortisation, capitalisation and step-up.

- **Optional "step_up" element**

Defines the coupon step-up(s). A step-up is an increase in interest payment. A bond can have many step-ups. This element must be composed of one or more of the following pair of "date"-"amount" elements:

  - **Mandatory "date" element**

    Specifies the step-up date at which the new rate . It can be any date from the first coupon date to the maturity date. Step-up dates can lie between coupon dates.

  - **Mandatory "amount" element**

    Specifies the amount by which the interest payment is increased. A negative amount will specify an interest decrease. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's based on nominal interest. For instance a nominal interest payment going from 4% to 5% would correspond to a step-up amount of 1.

- **Optional "date_adjustment" element**

Defines any coupon date adjustment. Defaults to "EOM" for End-Of-Month. All coupon and amortisation dates provided in the XML

should be adjusted with regards to this element. Coupon and amortisation dates generated by Phi (periodic coupons and/or amortisation...) will use this element to find the regular nominal dates.

- **Optional "cap" element**

For floating rate notes only. Specifies the highest interest payment the bond will pay. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's based on nominal interest.

- **Optional "floor" element**

For floating rate notes only. Specifies the lowest interest payment the bond will pay. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's based on nominal interest.

- **Optional "relative_date_adjustment" element**

For floating rate notes only. Defines coupon dates that are adjusted relative to the current next coupon date. Thus the date adjustment is also relative to the settlement date. It is composed of the following elements:

  - **Mandatory "from" element**

  Defines how the next coupon date is adjusted. It can be adjusted to the next business day or based on the business-day adjustments of the previous coupons. All the following coupon dates are based on the resultant adjusted next coupon date and the coupon frequency.

  - **Optional "always" element**

  Defines the current coupon date to be adjusted to an additional calendar day.

- **"detailed_coupons" element**

Defines a set of coupons that are irregular in date and/or amount. Note that when only the interest payments vary, it is much easier to specify a "periodic_coupons" element with step-ups. One or more "coupon" elements must be specified:

- **Mandatory "coupon" element**

Specifies a single coupon and includes the following elements:

  - **Mandatory coupon value:**

  Either of the 2 following elements must be defined:

- **"amount" element**

  Specifies the amount of the interest payment. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's nominal interest.

- **"margin" element**

  For floating rate notes only. Specifies the margin added to the coupon amount. It is a number of basis points of the face value, but doesn't include amortisation and capitalisation.

- **Optional "cap" element**

For floating rate notes only. Specifies the highest interest payment the bond will pay. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's based on nominal interest.

- **Optional "floor" element**

For floating rate notes only. Specifies the lowest interest payment the bond will pay. It is a 100-based percentage of the face value, but doesn't include amortisation and capitalisation – i.e. it's based on nominal interest.

♦ **Mandatory "frequency" element**

Defines the frequency at which the interest payments occur. Even

♦ **Optional "index" element**

Defines the index used to generate the interest payments. It is only a description field and is not used for analytics.

♦ **Optional "frn_data" element**

Used for floating rate notes. It is composed of the following elements:

- **Mandatory "refix_frequency" element**

  Contains a mandatory "frequency" element that specifies the refix frequency for the note.

- **Mandatory "reset_days" element**

  Contains a mandatory "date_context" element that specifies the time interval from the next coupon at which the coupon can be fixed.

- **Optional "leverage" element**

  Contains a mandatory "amount" element that specifies the leverage to apply on each coupon. It defaults to 1.

♦ **Optional "ilb_data" element**

Used for index-linked bonds

- **Mandatory "ilb_method" element**
- **Mandatory "day_count_type" element**
- **Mandatory "index_value_at_issue" element**
- **Optional "principal_is_index_linked" element**
- **Optional "coupons_are_index_linked" element**
- **Optional "principal_is_current_pay" element**
- **Optional "coupons_are_current_pay" element**
- **Optional "coupons_are_capitalised_and_paid_at_maturity" element**

♦ **Optional "amount_adjustment" element**

Specifies the amount adjustment that the coupon amounts are subject to.

□ **Optional "partly_paid_schedule" element**

Defines a series of principal part-payments to the issuer, as opposed to full payment at issue date. Note that the issue price defaults to 100 face value. It is likely that partly-paid bonds have a specific issue price less than 100. In which case an issue price should be specified (see "issue" element"). It is composed of one or more part-payments. The following pair of "date"-"amount" elements, represents each part-payment:

♦ **Mandatory "date" element**

Defines the part-payment nominal date

♦ **Mandatory "amount" element**

Amount is in 100-based percentage of the face value.

Optional "option_schedule" element

Defines callable and/or puttable bonds. It is composed of the following elements:

□ **Mandatory set of periodic or detailed options:**

Either of the following elements must be set:

♦ **"periodic_option_schedule" element**

Defines a series of either Call or Put options whose exercise dates occur at regular intervals, and whose strike is the constant. The End-Of-Month date adjustment is used. It is composed of the following elements:

- **Mandatory "exercise" element**

Specifies the first exercise. It is composed of:

▪ **Mandatory "option_style" element**

Either "call" or "put", and also defines the type of all subsequent options.

- **Mandatory "start" element**

  Start date of the first option.

- **Optional "end" element**

  Defined for American options only. It defines the last date at which the first option can be exercised.

- **Mandatory "strike" element**

  Amount - in 100-based percentage of the face value - at which the bond is paid back. It doesn't include the interest accrued from the last coupon payment (the so-called "dirty strike" includes both the final interest and the principal payments).

- **Optional "frequency" element**

Defines the regular intervals between options. It is used for both the start date and end date of the option. The frequency defaults to the coupon frequency.

- **Optional "termination_date" element**

Defines the end date of the option schedule. All options start dates lie on or before the termination date. The termination date defaults to the maturity date of the bond.

◆ **"detailed_option_schedule" element**

Defines a set of Call and/or Put options. It must be composed of one or more "exercise" elements:

- **"exercise" element**

Specifies a single option. It is composed of the following elements:

- **Mandatory "option_style" element**

  Either "call" or "put".

- **Mandatory "start" element**

  Start date of the option.

- **Optional "end" element**

  Defined for American options only. It defines the last date at which the option can be exercised.

- **Mandatory "strike" element**

  Amount - in 100-based percentage of the face value - at which the bond is paid back. It doesn't include the interest accrued from the last coupon payment (the so-called "dirty strike" includes both the final interest and the principal payments).

- **Optional "notice_days" element**

  Specifies the number of days from the trade date to the option exercise date below which the option cannot be exercised. If a bond has been called or put, the XML definition for the bond should be updated to reflect the new maturity of the bond.

"rolling_guarantee" element

Optional element that defines the rolling guarantee for the bond. It will affect stripped analytic measures, and also the bond cashflow if the bond defaults. It is composed of the following elements:

- **Optional "start" element**

  Defines the start of the rolling guarantee. It defaults to the issue date of the bond or the interest accrual date if the former is not specified.

- **Optional "end" element**

  Defines the end of the rolling guarantee. It defaults to the maturity date. Any cashflows after that date is not affected by the rolling guarantee.

- **Mandatory "nb_periods" element**

  Defines the number of guaranteed cashflows. Unless the bond has defaulted, guaranteed cashflows: - are on or after both the settlement date and the start of the rolling guarantee; - are on or before the end of the rolling guarantee; - are only in number of "nb_periods".

- **Optional "principal_guaranteed" element**

  Sets the principal to be guaranteed.

- **Mandatory "index" element**

  Defines the guarantor curve used to discount the guaranteed interest payments. The principal is discounted using a separate discount rate. This element is only a description field and is not used for analytics